Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

autumn is far advanced, and stormy weather becomes frequent. This difficulty, I apprehend, however, is not an insuperable or extraordinary one, since it is common to all similar operations at sea requiring for their accomplishment a like period of four or five consecutive days.

I have assumed that the ice ceases to obstruct the south-west shore of Greenland about the middle of September; but we can no more predict its movements than we can foretel the temperatures of the seasons, and the winds by which those movements are governed.

Exceptional seasons occur when it would be imprudent to attempt laying a Greenland cable: also rare seasons when it could be laid as early as July: again, there are seasons when the icedrifts are detached from each other, so that vessels watching their opportunity may freely pass into harbour or out to sea during the summer months.

In order to meet these ever-varying circumstances, it is the more necessary that the utmost caution be observed in all matters connected with the laying down of the Greenland lengths of the great cable; that the most suitable steamers be selected, and the highest engineering and nautical skill be employed.

And that this country possesses all the needful appliances and the amount of professional talent requisite for the accomplishment of this great undertaking, is no more to be doubted than that she possesses men of sagacity to appreciate its vast utility, and of commercial enterprise to bring about so desirable an issue within the next two or three years.

The second Paper read was—

## 2. *Synopsis of the Surveys of the Fox, under the Command of* Capt. ALLEN YOUNG, F.R.G.S. By Sir CHARLES T. BRIGHT, F.R.G.S.

I HAVE been requested by the promoters of the North Atlantic Telegraph to present to the Royal Geographical Society a synopsis of the report which has been handed to me by Captain Allen Young, upon his recent voyage in the steam yacht *Fox*, and his careful and elaborate survey of the proposed telegraphic route between Europe and America, by way of the Færöes, Iceland, and Greenland.

### FÆRÖE ISLANDS.

This most interesting group of isles, the capital of which is Thorshaven, lies some 200 miles north of Scotland, and is under the authority of the Danish Crown. I will not occupy the time of the

Society in discussing the political, physical, or other characteristics of these islands, but proceed at once to quote some interesting extracts from Captain Young's report. He says:—"We were naturally anxious to reach the spot at which our work was to commence, and to ascertain the first foreign station at which the telegraph cable was to be landed. We were glad to make the Færöe Islands, distant 50 miles, on the evening of the 2nd August, the remarkable clearness of the atmosphere and the height of the land making our distance from it apparently far less than we were by our observations. When 46 miles E.S.E. from Naalsöe we obtained soundings in 102 fathoms, sand and shells. We here passed through many patches of discoloured water of a reddish hue, caused probably by minute animalcules on the surface, specimens of which, brought up by the towing-net, were preserved. Specimens of water, both on the surface and at various depths, were frequently obtained during our voyage and preserved, the temperature and specific gravity being registered in the meteorological journal.

"On the morning of the 3rd the land was obscured by clouds and mist, which, as the sun rose, gradually dispersed, and enabled us to obtain views of the land, and also to fix our positions by Born's chart to commence a line of soundings into the north point of Naalsöe; the depths were 36 to 26 fathoms, with a bottom of sand and shell."

*Thorshaven.*—"On rounding the north part of Naalsöe we took a fisherman on board as pilot, and at 10·50 anchored in Thorshaven, and immediately commenced an inquiry and examination of the locality, and testing the accuracy of all the charts and maps in our possession. The results were as follow:—Thorshaven and bay is protected by Naalsöe, and is land-locked, excepting on two points to the south-east, and on one point to the north-east. A swell sets in to the inner harbour with south-east gales; but this cannot be to any very great extent, from the fact that vessels lie at their moorings throughout the winter. The bay has good anchorage, varying in depth from 25 to 8 fathoms, bottom of sand, gravel, and shells, with a few patches of hard ground. Vessels usually moor in the two inner harbours or creeks, the northern being most frequented for the facility it offers for loading and discharging cargoes. Either of the inner harbours would do very well to land the telegraph-wires; but from the many vessels frequenting the port it appeared desirable to select another place; for, even were the cable to be buoyed, the risk from the ships' anchors would be considerable, on account of the want of space; but half a mile southward of Thorshaven is a small cove called Sandygerde, where the cable could be landed in safety and clear of ships' anchors. This cove is 1½ cable's length across and about the same depth, and shoals gradually to a sandy beach; it is intersected at the head by a watercourse and mill, the land sloping gradually up an extensive valley to the interior. As many additional soundings were obtained across the fiord as our time would admit, proving that although the channel is uneven, there is nothing to prevent bringing a cable in from sea. From the most reliable information from pilots and our own observations, the stream on the flood never exceeds 4 knots on the strongest spring tides, whilst on the ebb it is much weaker, and at times scarcely perceptible. It is high water at full and change at 4 o'clock: the flood runs to the southward. The Gulf Stream appears to sweep round these islands from left to right, or direct as the hands of a watch; and therefore in sailing from Thorshaven for the northward, by starting with the first of the flood and passing to the southward of Stromöe, and through Hestöe and Westmanshaven Fiords, you can carry a 9 hours' favourable tide. The rise of tide at Thorshaven does not exceed 6 feet."

*Westmanshaven.*—"We left Thorshaven at 1 P.M., passing through Hestöe and Westmanshaven Fiords, and anchored in Westmanshaven in the evening. The scenery in these fiords is very magnificent, and as we steamed through with a strong head-wind and weather tide, the surface of the water covered with sea-birds, the lofty hills on either hand rising to the height of 1500 to 2000 feet, with vast basaltic caverns and columns in the cliffs, formed a picture not easily forgotten. As I had heard that Sir Leopold M'Clintock had already examined this port, I did not deem it necessary to delay the ship for that purpose. The fiord appears clean and clear, with deep water close into either shore. I was informed that there is 70 fathoms water in the middle, a little north of Welbestad, and the stream in strongest spring tides runs 6 knots through the fiord. The rise of water is much influenced by the winds outside; it has reached 10 feet at spring tides, and has been known as low as 4, but the mean rise appears to be from 6 to 8 feet. Westmanshaven is said to be the best harbour in the islands; it is completely landlocked, with a bar, probably formed of the débris washed down from the surrounding hills, and accumulated by the action of the streams and eddies in the fiord. I fear the current in this fiord would be disadvantageous."

*Haldervig.*—"We left Westmanshaven on the evening of August 5th, and, after weathering the northern extremity of Stromöe, entered the sound between Stromöe and Osteröe, and anchored at Haldervig at 11·30 P.M. on the same night. An examination of the port and estuary of the sound was commenced. The results of these observations, which occupied two days, were, that little or no stream is found in the sound; that Haldervig has good anchorage, and is perfectly landlocked; the deepest water is 34 fathoms, bottom black mud and sand, but that a sand-bar exists between Eide Point and Stromöe, over which there are 8¼ fathoms in the deepest part; and as in northerly gales the sea is said to break upon it, I consider that the cable would require a strong shore-end to ensure its safety in crossing this place. This bar lies rather within the entrance and narrowest neck of the sound." In the summary Captain Young states:—" At Haldervig we surveyed harbour and fiord, and found all satisfactory, and I think that place to be well adapted for the reception of the cable. We found but little current, and the cable can be taken in, in a tolerable depth of water, into a perfectly land-locked position."

## ICELAND.

" On approaching the coast of Iceland we got occasional soundings towards Ostré Horn, under which we were obliged to anchor in a dense fog, after getting inside an extensive and dangerous reef of rocks, called by the Icelanders the Hartinger and Bortinger. These reefs lie two miles east (true) off this cape. They do not appear on the Danish surveys, but I afterwards found them as a single rock upon a French chart."

*Beru Fiord.*—" On the morning of August 12th, the fog having lifted, we weighed under steam, and got into a position to carry a line of soundings into Beru Fiord, between the islands of Papey and Kogar Point: these soundings average about 30 fathoms, principally sand and shells. We anchored off Djupivogr factory the same day, and it being Sunday we ceased operations during the afternoon. The weather that day was the finest we had had since we left England, and the evening was truly summer-like. During the following five days, and when not prevented by the prevalent rain and fogs, we proceeded with the examination of the fiord, and finding it would not be advisable to carry a cable into the small harbour of Djupivogr, on account of many rocks in its vicinity and its being the anchorage of the small vessels frequenting the coast, we sought for a more suitable landing-place higher up the fiord, and succeeded in finding an excellent bay, called Gautavik, on the north shore, five miles from the entrance. A depth of near 30 fathoms can be carried in from sea to within a quarter of a mile of the shore, while the bay itself afforded good protection and anchorage for any large ships that might be employed in the undertaking.

"High water at Djupivogr at 3 o'clock, full and change; rise 6 feet. The tide has been known to rise 6½ feet before the coming of easterly gales; about the same time flood outside runs S.S.W. (true), ebb N.N.E., between Papey Island and the main. The strongest known stream has 4 knots, but the average in ordinary spring tides is not more than 2½ knots.

"In 1860 drift-ice appeared off the coast and entered the fiord, and again (though in very small quantities) in 1859-60 (sic). This ice, called here Greenland ice, is the ordinary washed and decayed floe-ice, and comes from the north-west. *No icebergs have ever been seen on the coast.* The drift-ice appears with northerly and departs with southerly winds, and less of it comes into Beru Fiord than any other fiord on the east coast of Iceland; the residents accounting for this fact by Beru Fiord having a south-west direction, and is consequently protected by the more northerly and projecting capes which shunt the ice off, while the local tides keep it drifting up and down the coast. The fiord itself never freezes, but thin ice has been known to cover the harbour off the factory for a day or two during the winter.

"A tolerably complete survey of the fiord from the entrance to Gautavik was completed, but a further examination would be advisable outside, to ascertain the proper channel in which to lay the cable. The greatest difficulties experienced on the coast by seamen, are from the prevalent fogs during the summer months, and with easterly winds, *and this would render it advisable to start from this coast towards Fœröes*, in laying the cable, because making a good landfall here would be attended with considerable uncertainty." Finally, as to the practicability of Beru Fiord, Captain Young says, "There will be no difficulties from the sea, ice, or otherwise, and the only obstacles will be from fogs and thick weather, but which may be overcome by selecting proper seasons, and taking precautions in landing or embarking the telegraph cable."

*Reikiavik.*—Captain Young sailed from Beru Fiord on the 17th day of August, and arrived at Reikiavik, the capital of Iceland, on the 21st day of August, and after making inquiries as to the coasts, he says, "I then determined to examine Hval Fiord, as from its situation it appeared to have the advantage over any place in Faxe Bay, and on the 27th I proceeded up that fiord, sounding it as far as 'Maria Havn,' a small harbour and salmon river on the south shore, 7 miles from the entrance of the fiord. The least depth of water in the channel of the fiord is 14 fathoms, with deeper water both outside and in, the general depth being 18 to 20 fathoms, soft mud. The cable could be taken into Maria Havn through soft mud, on a sandy beach in a landlocked position. Hval Fiord is protected from a heavy sea breaking into it by the shoals of 'Vestrhram' and 'Sydiahraun' in Faxe Bay, and on which there is less water than in the shoalest part of the channel of the fiord. The bays in the fiord are sometimes covered with thin ice, but the fiord itself never freezes; and with reference to drift-ice on this part of the coast, I cannot do better than quote the words of Sir Leopold M'Clintock. 'Faxe Bay never freezes over, and I can find no record of drift-ice within, since 1683. Merchant-vessels come and go throughout the winter.'"

### GREENLAND.

The *Fox* left Reikiavik August 31st, and after a very rough passage arrived at Frederikshaab October 2nd. Captain Young remained there to make some necessary repairs, and finally arrived at Julianshaab on the 22nd October. He then reports:—"Having made all inquiries about Igalikko or Julianshaab Fiord, I deemed it advisable at once to commence a survey of this beautiful arm of the sea, and acting upon the opinion of Colonel Shaffner, that were this fiord found practicable, the electric circuit from Reikiavik would not be too extended."

*Julianshaab Fiord.*—"We first sounded up to the head of the Fiord, which gave an opportunity for our landing a travelling party, under command of Dr. Rae, to examine the inland ice and nature of the country. A party also went to the Old Nordisker Ruins, at Igalikko." Returning with the *Fox* to Julianshaab, October 27th, Captain Young then surveyed the estuary of the fiord, and from the soundings obtained, says, "I am of a decided opinion that *a depth of not less than* 150 *to* 160 *fathoms* can be carried from the middle of the fiord abreast the settlement, out to sea, with a general muddy bottom.

"*The depth of water will effectually preclude injury to the cable from the largest icebergs ever seen upon the coast.* Although many bergs lay along the coast, we saw none aground in this valley of the fiord, nor, according to information obtained from the residents, have they been seen grounded in that channel." Captain Young then proceeds to say—"This report and my previous letters will show that my decided opinion (so far as we have been upon that route) is favourable to the practicability of the undertaking, and that Julianshaab will, under all circumstances, be well adapted for the reception of the cable. With regard to the operation of laying the cable, I consider that no apprehension may be felt on that point; for, from the sudden disappearance which we witnessed of the ice from the coast, and from the ice *usually* dispersing from the south-east shores of Greenland in the autumnal months, opportunities will always occur when a ship having the cable on board, and lying in readiness in Julianshaab, may depend upon having a period of clear and open sea. *The cable once laid, no drift ice can in any way injure it, if the proper precautions are taken in securing the shore end.*"

*Ice of the Greenland Seas.*—"Since my arrival I have seen the admirable remarks of Mr. J. W. Tayler upon the southern coast of Greenland, the results of his experience during seven years' residence there. His opinions must be most satisfactory to you, and I am sure that all who are interested in the work must be grateful to him for having so freely given them.

"I perfectly coincide with his views with regard to the size of the icebergs frequenting the above coast and accompanying the Spitzbergen drift-ice; and as this bears upon my own opinion, that no iceberg will ground in the channel of Julianshaab Fiord, I think I may here explain my reasons for this statement. Having navigated the entire west coast of Greenland, and into all the principal settlements, and having experienced a whole winter's drift in the ice, through Baffin's Sea and Davis' Strait, I have had occasion to remark and to gather all possible information upon the ice movements.

"Around the coast of Greenland, westward of Cape Farewell, there are two distinct descriptions, or rather kinds, of drift-ice ever approaching, but never meeting together. The first is the ice formed during the winter on the vast area of Baffin's Sea and the different channels from the Polar Seas westward of Greenland. This ice, called by the Greenlanders *the west ice*, often blocks up throughout the year the upper part of Melville Bay, and drifts constantly throughout the winter and early spring to the southward, through Davis' Strait, into the Atlantic. It seldom comes in contact with the coast of Greenland below the parallel of Disko, *and there is always an open sea between it and Greenland as far up as Holsteinberg throughout the winter.* The second is the Spitzbergen, called also the 'store ice,' which, as has been shown, comes down the east coast of Greenland, around Cape Farewell, and is carried by the current up the west coast, at times even to the Arctic Circle; but by which time it is usually pretty much broken up, and, if not entirely dispersed, the last remnants are supposed to return southward, by Davis' Strait, to the Atlantic—so near these two great ice streams approach, that vessels bound to the colonies have in the early spring passed up Davis' Strait with the west ice and the Spitzbergen ice on either hand. But as there are two kinds of oceanic ice, so also are there two distinct classes of icebergs, namely, the bergs from the stupendous glaciers far up the west coast of Greenland, and especially in Melville Bay; these bergs attain an astonishing magnitude, but like the west ice, which they accompany or outsail, they do not come upon the west coast of Greenland below the same parallel, although in exceptional seasons of violent gales, such as the last, they may be blown in upon the land a little more to the southward; and I saw some of these *ice islands* last October aground, upon and near Tallert Bank, northward of Fredrikshaab. The other icebergs are those which accompany the Spitzbergen ice, and may be said to follow its movements. They are launched from the glaciers far up the east coast of Greenland, and from those in the island of Spitzbergen; and besides being originally far less in their dimensions, they are exposed during their long passage southward to the warmer Atlantic winds and heavy swells, and are proportionally reduced before their arrival at Cape Farewell. The bergs from the southern glaciers of Greenland are but small, and need scarcely to be taken into consideration; for, as they must come out from the heads of the fiords, they surely would not take the ground in again entering the *channel* of the deepest fiords.

"With regard to the flotation of ice, it has been calculated that seven-eighths of a cubical mass of ice will be immersed; but icebergs being very irregular in their formation, and having usually very peaked and angular summits, whilst below the water they are smooth, rounded, and most frequently widened out, I think that icebergs are not found that draw more water than the proportion of six feet below to one foot of perpendicular height above the water. Therefore in 150 fathoms of water (the very least found in the entrance to Julianshaab Fiord) an iceberg of an elevation above the water of 150 feet, or having an entire perpendicular height of 1050 feet, will there be suspended above the ground, and such bergs are not to be met with in that place."

*Remarks upon the Seasons.*—"The finest months in the Færöes are June and July, and in these months only should the cable be laid, and then about the last quarter of the moon, because the tides are greater at the full than at the change, consequently the neap tides immediately after the last quarter should be selected, as the currents are then inconsiderable. I have already given my reasons for recommending that the cable be laid from Iceland towards the Færöes, not only on account of the prevailing fogs on the east coast of Iceland, but also from the greater facilities for making the coast of the Færöes, and the opportunity that the comparatively speaking shallow water off the north-west coast would give of shipping and buoying the cable in the event of a sudden gale of wind occurring at the time of laying it. The finest months upon the east coast of Iceland are also June and July, but I was informed that the weather is clearer earlier in the season, in the months of May and June—I suppose from the alternations of temperature being then less frequent. A few hours, however, of clear weather would always carry a ship beyond these mists, which usually hang only on the land. With reference to Faxe Bay station, the west coast of Iceland is generally free from fogs, and the gulf stream which sets round Cape Reikianess, and appears to keep up a continuous flow around Faxe Bay to the northward, passing out by Snœfellssness, also appears to considerably affect the climatic condition of the west coast. Navigation is open all the year round, and the operation of bringing the cable here can be timed to the opportunities for departing from Greenland. A fine pyramidal beacon has lately been erected on the Skagen, and is of great assistance to navigators entering Faxe Bay from the southward."

*Conclusion.*—Before concluding, it is proper to state that the voyage was one surrounded with much peril, on account of the succession of gales and the extraordinary quantities of ice found in the Greenland seas; never within the memory of man has there been so much and so long a continuation of ice upon the Greenland coasts as during the past year. In the arduous labours of the voyage Captain Young was most ably assisted by Mr. J. E. Davis, Master in the Royal Navy, who by the kindness of Captain Washington, Hydrographer to the Admiralty, was permitted to accompany the expedition and take part in the necessary surveys; and his former well-known services under Sir James Ross in the Antarctic regions, and great experience as a marine surveyor, enabled him to render the most valuable assistance in the especial mission of the *Fox*, which is acknowledged by Captain Young in his report in the highest possible terms. During the voyage various specimens of deep interest to the geologist and naturalist were collected; a large number of scientific observations were made, and a detailed meteorological journal was kept, which, together with other valuable information and an extensive collection of photographs, made with great zeal by Mr. Woods, under very difficult circumstances, have been furnished by Captain Young and Dr. Rae to the promoters of the enterprise, with the hope that they will be found to contribute to the cause of science, as well as to the immediate object for which they were made. Time will not now permit me to give further details of this most interesting voyage; but any members of this Society who may desire to make personal inspection of the charts, meteorological tables, logs, reports, and specimens, will be gladly permitted to do so.

Having thus presented to the Society some of the most valuable and interesting portions of Captain Young's report, I have only to observe, that the result of the recent survey has been to remove from my mind the apprehensions which I previously entertained in common with many others, as to the extent and character of the difficulties to be overcome in carrying a line of telegraph to America by the northern route.

Prior to the dispatch of the surveying expedition we had no knowledge of the depth of the seas to be crossed, with the exception of the few soundings obtained by Colonel Shaffner in 1859, and our information as to the nature of the shores of Greenland in regard to the requirements for a telegraphic cable was equally small.

These points are of vital consequence to the prospects of the North Atlantic Route, and the survey has placed us in possession of satisfactory particulars respecting them. The soundings taken by Sir Leopold M'Clintock will be a guide in the selection of the most suitable form for the deep-sea lengths of the cables, while the information furnished by Captain Young will direct the construction of the more massive cables to be laid in the inlets of the coast. It is not necessary to determine upon the precise landing places and other points of detail in connection with the enterprise at the present time, but the promoters of the undertaking have received ample encouragement from the survey, and from the testimony of competent and experienced voyagers and sojourners in the countries to which the line is to be carried, to warrant them in proceeding with their labours with renewed vigour and confidence. When they have achieved that success which their perseverance and energy deserve, I am sure they will always gratefully remember that their endeavours at the stage of their operations which is now under discussion would have been very much less productive of good results, but for the patriotic foresight of Lord Palmerston in ordering the *Bulldog* on her late successful service; and for the assistance of Sir Leopold M'Clintock, Captain Young, Dr. Rae, and the Commissioners appointed to accompany the *Fox* by the Danish Government, as well as others who took part in the cause, whose patience and devotion to their self-imposed work have been above all praise. Nor can those interested in this important undertaking forget the great assistance which has been rendered to them by the Royal Geographical Society.